

# NAS NORTH ISLAND - NAVY REGION SOUTHWEST NAVY ENVIRONMENTAL LEADERSHIP PROGRAM

## CONSERVATION

### SOLAR ENERGY & LIGHTING PROJECTS

#### LEAD ACTIVITY

Naval Air Station (NAS) North Island

#### STATUS

Active

#### MISSION

Promote energy conservation through use of solar energy

#### REQUIREMENT

The Navy typically uses electric-powered lights. To promote energy conservation activities at Navy sites, alternative forms of lighting, such as solar-powered illumination, are required.

#### DESCRIPTION

At NAS North Island, cost estimates were obtained for power systems for security lighting at the entrance to seven weapons magazines and to illuminate the sign for the Morale, Welfare and Recreation (MWR) Department's Island Club. Two options, electric power and solar power, were considered based on cost and effectiveness.

Previously, electricity for lighting for the seven magazines was provided by an antiquated underground 2.4 kilovolt series electrical circuit that had shorted out and failed. The estimate for an electrical power system included: a 480/277V or 208/120V step-down transformer, providing 90-watt low pressure sodium fixtures on poles at the magazines and extensive trenching in sensitive areas. The cost was estimated at \$80,048. This cost did not address MWR sign illumination that would have required approximately 75 feet of additional trenching.



MWR Island Club Illuminated Sign

A solar photovoltaic option was investigated and bids solicited for a fluorescent light system that would remain illuminated all night and have a minimum five day-autonomy. Photovoltaic cells convert sunlight directly into electricity by the interaction of photons and electrons within a material that has a limited capacity for conducting an electric current, that is, a semiconductor material. To create a photovoltaic cell, the electrical properties of the semiconductor material are modified by adding a chemical element, an impurity, which allows an electric current to pass through the material. A thin layer of

each material, the impurity and the semiconductor, are joined to form a junction. Photons, striking the cell, dislodge a mismatched electron within the impurity. Through a grid of physical connections, the current generated is gathered for use.

The unit cost for the solar photovoltaic system from the selected bidder was \$1,750 for each system consisting of a 24-watt fluorescent floodlight, weather-proof battery box, and control circuitry. Equipment costs amounted to \$14,000 with another \$14,835 added for installation. The total cost for the solar system was \$28,835.

Based on cost savings and environmental benefits, the solar photovoltaic option was chosen. The Island Club sign unit was installed, as well as seven units to illuminate the weapons magazines.

NAS North Island is currently exploring the opportunity to design and build an electric vehicle charging station using a solar photovoltaic system.

### **BENEFITS**

- Trenching for installation of power transformers was eliminated, saving money
- The solar photovoltaic system saved \$51,213 in installation costs
- Electric grid power consumption was reduced by approximately 3.8 megawatt-hours annually
- The solar system will help reduce source emissions generation
- An estimated \$380 in energy costs will be saved annually

### **ACCOMPLISHMENTS/CURRENT STATUS**

<b>Date</b>	<b>Activity</b>
MAR 1996	Illuminated sign powered by solar energy installed
MAR 1996	Solar powered illumination installed in the weapons magazine
JAN 1999	Explore opportunity to design and build an electric vehicle charging station using photovoltaic panels

### **FUTURE PLAN OF ACTION & MILESTONES**

<b>Date</b>	<b>Activity</b>
Ongoing	Continue to search for solar technologies to aid in the reduction of energy consumption

### **COLLABORATION/TECHNOLOGY TRANSFER**

Solar-powered illumination can be used at other places at NAS North Island and other Navy installations. Solar lighting systems are available on GSA Schedule 62IT (Energy Efficient Products).

### **BIBLIOGRAPHY**

- GSA Environmental Products Guide, Spring 1998.

### **RELATED GOVERNMENT INTERNET SITES**

[GSA Federal Supply Service Environmental Products Guide](#)  
[GSA Federal Supply Schedules Program](#)

**RELATED NAVY GUIDEBOOK REQUIREMENTS**

- 10006 Affirmative Procurement Program
- 10099 Miscellaneous Pollution Prevention Requirements

*UPDATED: 03/01/02*